snapAG PLANT BIOTECHNOLOGY

GMO FOODS

What is a GMO food?

GMO (**genetically modified organism**) foods are made from crops that have been genetically modified. GMO is not a precise term, since most foods have had their genes modified by humans just by being domesticated. A better term is genetically engineered, or GE. These crops have been modified by moving bits of DNA called genes from an unrelated organism into the crop plant (**transgenic**) or by changing the plant's own genes (**cisgenic**).

What's the DIFFERENCE?

There is little difference between GE and other foods. For whole foods such as fruit, the only tip-off is they may have fewer spots ("Rainbow" Hawaiian papaya) or may last longer without browning (Arctic® apples and Innate® potatoes). While they may not look different, the methods used to create them are. For instance, Rainbow papaya are transgenic, that is, they have a gene from the papaya ringspot virus within them to make them resistant to the disease. GE apples and potatoes were created using "gene silencing," a cisgenic technique that "turns off" certain genes – in this case, the ones involved in browning.

Foods such as sugar or oil have all other materials such as fibre, proteins and DNA removed during processing. These products are identical whether they come from GE or non-GE sources since they contain no DNA.

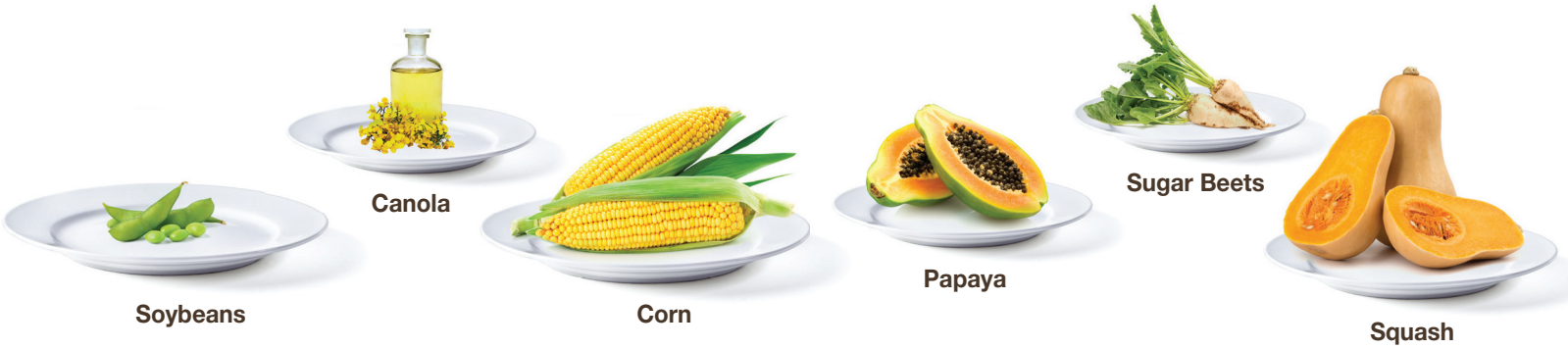
Somewhere over the Rainbow

In the 1990s, a disease called papaya ringspot virus threatened to totally wipe out papayas, Hawaii's second most important crop, and with it, the livelihood for many small family farms. Government scientist Dennis Gonsalves used genetic engineering to create a resistant variety, the Rainbow papaya. Within two years, more than half of Hawaiian papayas were genetically engineered varieties – a number that jumped to 90 per cent when key markets approved them for import. The Hawaiian papaya industry was saved.

WHAT ARE SOME TYPICAL GMO FOODS?

There are few genetically engineered whole foods on the market. Papaya and some types of squash have long been available. More recently, apples and potatoes are appearing.

That said, genetic engineering is used to produce varieties of crops such as canola, sugar beet, soy and corn. Products made from these crops are very common. Examples include cooking oil, tofu, syrup, sugar and ingredients in other products.



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WHAT'S IN IT FOR ME?

The first crops created through genetic engineering were designed to benefit farmers, making it easier to control insect and weed pests. These crops also delivered benefits such as lower environmental impact due to less spraying and tillage and safer food from reduced contamination from things like mold. New crops are being designed with the consumer more directly in mind.

DOWN WITH BROWNING!

Apples begin to turn brown as soon as you bite or cut them, making them unappealing to eat. The result: a lot of perfectly good apples get thrown away. Okanagan Specialty Fruits Inc., a grower-led company in British Columbia, worked with scientists using a technique called gene silencing to interfere with or shut off the gene for the enzyme that makes apples turn brown.

This is a "cisgenic" technique, that is, no genes are added from anywhere else. The result is Arctic apples that don't turn brown when bumped or cut open.

Browning (and blackening from bruising) is also a problem with potatoes, leading to lots of wastage. Developers of the Innate potato also used gene silencing to produce a potato that stays white.

SHOULD GMO FOODS BE LABELLED?

People who believe GMOs are something to be avoided would like to see them labelled. Others argue this would amount to scaring away customers for no reason. It's not a trivial question. Would labelling tell consumers anything useful if there is no nutritional difference or explanation of what is changed between a GMO and non-GMO food?

Mandatory labelling would also require separate handling of genetically engineered crops right from the field to the supermarket shelf – an enormous undertaking with no discernible benefit to the consumer.